

**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Applicant:** Il-Young SOHN

**Serial No.:** unassigned

**Filed:** Concurrently herewith

**Docket:** 8836-106 DIV

**For:** CMOS ACTIVE PIXEL SENSOR

Assistant Commissioner for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Prior to examination on the merits of the above Divisional Application, please amend the application as follows:

**IN THE SPECIFICATION:**

On page 1, on a new line after the title, please insert the following paragraph:

**-- Cross-Reference To Related Applications**

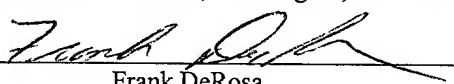
This application is a Divisional of U.S. Application Serial No. 09/320,873 filed on May 27, 1999, which claims priority to Korean Application No. 98-20364 filed on June 2, 1998. --

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**CERTIFICATION UNDER 37 C.F.R. § 1.10**

I hereby certify that this Preliminary Amendment is being deposited with the United States Postal Service on this date of February 4, 2002 in an envelope as "Express Mail Post Office to Addressee" Mail Label Number EL922712413US addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Date: 2/4/02

  
Frank DeRosa

**IN THE CLAIMS:**

Please cancel claims 1-4 and 7-8 without prejudice.

**Please add the following New claims:**

9. (New) A method for compensating loss of sensitivity of a CMOS active pixel sensor, comprising the steps of compensating for loss of pixel voltage of the CMOS active pixel sensor caused by leakage current of a first photodiode using leakage current of a second photodiode.
10. (New) The method of claim 9, wherein the second photodiode is shielded from light incidence.
11. (New) The method of claim 9, wherein the step of compensating comprises increasing the amount of current flowing to a bit line in an amount substantially proportional to the amount of decreased current flow to the bit line due to a decreased voltage of the first photodiode.
12. (New) The method of claim 11, wherein the increased current flow to the bit line is generated by a sense transistor having a gate that is connected to the second photodiode.

13. (New) A method for operating a CMOS active pixel sensor, comprising the steps of:  
resetting a voltage level of a first photodiode and a second photodiode;  
applying light energy to the first photodiode;  
reading a pixel voltage of the CMOS active pixel sensor by sensing the voltage of the first photodiode after light energy is applied; and  
compensating for a reduction in the pixel voltage caused by leakage current of the first photodiode using leakage current of the second photodiode.

14. (New) The method of claim 13, wherein the second photodiode is shielded from light incidence.

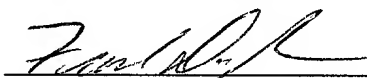
15. (New) The method of claim 13, wherein the step of compensating comprises increasing the amount of current flowing to a bit line in an amount substantially proportional to the amount of decreased current flow to the bit line due to a decreased voltage of the first photodiode.

16. (New) The method of claim 15, wherein the increased current flow to the bit line is generated by a sense transistor having a gate that is connected to the second photodiode.

## REMARKS

Entry of the Preliminary Amendment prior to the examination of the above-identified divisional application on the merits is respectfully requested. No new matter has been added by the Preliminary Amendment. A substitute page 1 is annexed hereto illustrating the above amendment to the specification. Early and favorable consideration of this application is requested.

Respectfully submitted,



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## CMOS ACTIVE PIXEL SENSOR

### Cross-Reference To Related Applications

This application is a Divisional of U.S. Application Serial No. 09/320,873 filed on May 27, 1999, which claims priority to Korean Application No. 98-20364 filed on June 2, 1998.

### Field of the Invention

The present invention relates to an image sensor, and more particularly to a CMOS active pixel sensor capable of compensating loss of sensor sensitivity due to leakage current in a light sensing device.

### Background of the Invention

Charge-coupled devices (CCDs) have been the mainstay of conventional imaging circuits for converting images in the form of light energy into electrical signals. Advantages of CCD use include high sensitivity and full-factor. However, CCDs suffer from a number of weaknesses including limited readout rates and dynamic ranges, and difficulty in integrating CCDs with CMOS-based microprocessors.

Fig. 1 is a circuit diagram illustrating a conventional CMOS active pixel sensor. As shown in Fig. 1, the active pixel sensor (APS) 10 (or active pixel sensor cell) includes a photodiode 12 acting as light sensing means. This photodiode 12 has a cathode and an anode. The anode of the photodiode 12 is grounded, and the cathode thereof is collectively coupled to a source of N-channel reset transistor 14 and a gate of N-channel sense transistor 16. A drain of the N-channel reset transistor 14 is coupled to a power supply voltage Vdd, a source thereof is coupled to the cathode of the photodiode 12, and a gate thereof is coupled to a reset line 20.

The N-channel sense transistor 16 has a drain coupled to the power supply voltage Vdd, a gate coupled to the cathode of the photodiode 12 and the source of the reset transistor 14, and a source thereof coupled to a drain of N-channel row select transistor 18. A gate of the row select transistor 18 is coupled to a select line 22, and a source thereof is coupled to a bit line 24.